

Low Temperature Combustion

PhD students: Nikolaos Dimitrakopoulos, Maja Novakovic, Erik Svensson



Engine combustion has traditionally been limited to spark ignited flame propagation or compression ignited diffusion combustion. Both have severe limitations that are difficult to overcome. Spark ignition requires near-stoichiometric air/fuel ratio, requiring air throttling which is detrimental to efficiency. Diffusion combustion involves both rich and stoichiometric combustion emitting both soot and NO_x .

With a suitable level of premixing of fuel and air, combined with exhaust gas recirculation, both NO_x and soot can be drastically reduced avoiding throttling losses. High compression ratio and short combustion duration further improve the efficiency potential. Low cetane bio fuels such as ethanol and methanol lend themselves well to this type of combustion.

Low temperature combustion is best suited for a low to medium range speed/load range and extending this range with fuel injection patterns as well as thermal management and gas management are interesting research problems.

